

Department of Water Resources

California Irrigation Management Information System

Sensor Specifications

The following sensor specifications, (except sensor heights, are provided by the particular sensor manufacturer):

1. Total solar radiation (pyranometer)
2. Soil temperature (thermistor)
3. Air temperature/relative humidity (HMP35)
4. Wind direction (wind vane)
5. Wind speed (anemometer)
6. Precipitation (tipping-bucket rain gauge)

1. Total solar radiation

Sensor: Pyranometer--high stability silicon photovoltaic detector (blue enhanced)

Model: LI200S

Maker: Li-Cor

Height: 2.0 meters

Specifications

Sensitivity: $\pm 5\%$ error under natural sunlight conditions. Typically 80 micro Ampere per 1000 watts per square meter.

Linearity: Maximum deviation of 1% up to 3000 watts per square meter.

Response time: 10 micro seconds.

Correction: Cosine corrected up to 80 degrees angle of incidence.

Azimuth: $\pm 1\%$ error over 360 degrees at 45 degrees elevation

2. Soil temperature

Sensor: Soil Thermistor--Fenwal Electronic UUT51J1 thermistor in water resistant coating.

Model: 107b

Maker: Fenwal/ modified by Campbell Scientific Inc.

Height: 15 cm (6 in) below soil surface under irrigated grass.

Specifications

Accuracy: Worst case ± 0.4 degrees C over -33 to 48 degrees C, ± 0.5 degrees C at -40 degrees C

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3. Air temperature/relative humidity

Sensor: Fenwall Thermistor/HUMICAP H-sensor
Model: HMP35C
Maker: Vaisala/modified by Campbell Scientific, Inc.
Height: 1.5 m

Specifications

Range: 0 to 100% RH, -35 to +50 degrees C
Accuracy: $\pm 2\%$ RH (0-90% RH), $\pm 5\%$ RH (90-100%), ± 0.1 °C over -24 to 48 °C range
Note: Both sensors are enclosed in a 12-plate naturally aspirated radiation shield made by R. M. Young.

4. Wind Direction

Sensor: 10K ohm potentiometer vane
Model: 024A
Maker: Met-One
Height: 2.0 meters

Specifications

Range: 0-360 degrees
Output: $0-10 \times 10^3$ Ohms
Threshold: 0.45 m per sec (1 mph)
Accuracy: $\pm 5\%$
Delay distance: less than 1.3 m

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5. Wind Speed

Sensor: Three-cup anemometer utilizing a magnet activated reed switch whose frequency is proportional to wind speed

Model: 014A

Maker: Met-One

Height: 2.0 meters

Specifications

Range: 0-45 m per sec (0-100 mph)

Threshold: 0.45 m per sec (1 mph)

Gust Survival: 0-53 m per sec (0-120 mph)

Accuracy: 1.5% or 0.11 m per sec (0.25 mph)

Distance constant is less than 4.6 m (15 ft). Distance constant is the distance air travels before the anemometer reaches 63 percent of the new speed after a sharp-edged gust has occurred.

6. Precipitation

Sensor: Tipping-bucket rain gauge with magnetic reed switch.

Model: TE525MM

Maker: Texas Electronics

Height: 1.0 meters

Specifications

Orifice: 24.5 cm (9.644 in)

Resolution: 0.1 mm

Accuracy: $\pm 1\%$ at 5 cm per hr or less.